

GRANT & HACKH'S CHEMICAL DICTIONARY

[American, International, European and British Usage]

*Containing the Words Generally Used in Chemistry,
and Many of the Terms Used in the Related
Sciences of Physics, Medicine, Engineering,
Biology, Pharmacy, Astrophysics,
Agriculture, Mineralogy, etc.*

Based on Recent Scientific Literature

FIFTH EDITION

Completely Revised and Edited by

ROGER GRANT

M.A., D. de l'U., Ph.D., C. Chem., M.R.S.C. Consultant

CLAIRE GRANT

M.B., B.S., M.R.C.P.E. Medical Practitioner

McGRAW-HILL BOOK COMPANY

*New York St. Louis San Francisco Auckland Bogotá
Hamburg Johannesburg London Madrid Mexico
Milan Montreal New Delhi Panama
Paris São Paulo Singapore
Sydney Tokyo Toronto*

BEST AVAILABLE COPY

Library of Congress Cataloging-in-Publication Data

Hackh, Ingo W. D. (Ingo Waldemar Dagobert), 1890-1938.
Grant & Hackh's chemical dictionary.

Rev. ed. of: Chemical dictionary. 4th ed. 1969.

I. Chemistry—Dictionaries. I. Grant, Roger L.

II. Grant, Claire. III. Title. IV. Title: Grant &
Hackh's chemical dictionary. V. Title: Chemical
dictionary.

QD5.H3 1987 540'.3 86-7496
ISBN 0-07-024067-1

Copyright © 1987 by McGraw-Hill, Inc. All rights reserved.
Printed in the United States of America. Except as permitted
under the United States Copyright Act of 1976, no part of this
publication may be reproduced or distributed in any form or by
any means, or stored in a data base or retrieval system, without
the prior written permission of the publisher.

1234567890 DOCDOC 8943210987

ISBN 0-07-024067-1

The previous edition of this book was *Hackh's Chemical Dictionary*,
4th ed., published by McGraw-Hill in 1969. It was prepared by Dr.
Julius Grant from a *Chemical Dictionary* compiled by Ingo W. D.
Hackh. The current, or 5th, edition of this book was prepared by Dr.
Roger L. Grant, whose father prepared the 4th edition.

*The editors for this book were Betty J. Sun and Susan Thomas,
the designer was Naomi Auerbach, and the production
supervisor was Teresa F. Leaden. It was set in Palatino
by University Graphics, Inc.*

Printed and bound by R. R. Donnelley & Sons Company.

BEST AVAILABLE COPY

compound containing the $-\text{HSO}_4$ radical derived from sulfuric a. a. value (1) Acidity expressed in terms of normality. (2) A. number.

acidation (1) Acidylation. Conversion into an acid. (2) Acidification; making a solution acidic.

acidify To add an acid to a solution until the pH value falls below 7.0.

acidimetry The titration of an acid with a standard alkali solution. See *quantitative analysis*.

acidity (1) Sourness. See *taste*. (2) An excess of hydrogen ions in aqueous solution; measured by (a) the intensity or degree of acidity, expressed as pH value, q.v.; (b) the amount of acidity, expressed as normality, q.v. Antonym: alkalinity. (3) The power of a base to unite with one or more equivalents of an acid. Antonym: basicity. amount of ~ The normality or percentage of an acid as determined by titration (effective acid). degree of ~ The strength of an acid expressed by its hydrogen ion concentration. Cf. pH.

acidium* Indicating a cation formed by adding protons to the acid of the anion; as, H_2NO_3^+ , the nitrate acidium ion.

acidosis A metabolic state in which the acidity of the body fluids (e.g., blood) is above the normal level.

acids See Tables 3 and 4 on pp. 11-13.

acidulate Acidify.

acidulation Acidation (2).

acidum Latin for acid. a. aceticum Acetic acid. a.

benzoicum Benzoic acid; etc.

acylation Acylation. The process of introducing an acid radical into an organic compound, e.g., acetylation (acetyl radical).

acical An aluminum alloy containing Cu 3-6, Fe 0.1-1.4, Mn 0-1.5, Mg 0.5-0.9, Si 0-0.4%. Cf. *aerometal*.

aci-nitro compound* Isonitro c. A colored isomer of a nitro compound containing the $\text{OH}(\text{O})\text{N}=\text{group}$.

acivinyal alcohols Unsaturated ketols.

Ackermann automatic reckoner A device to determine the dry substance of milk from its specific gravity and fat content.

Acker process The manufacture of sodium hydroxide by electrolysis of molten salt using molten lead as cathode.

acme burner A bunsen burner with regulators for gas and air, constructed so that the flame cannot strike back.

acmite $\text{NaFeSi}_2\text{O}_6$. Aegirite. A rock-forming monoclinic pyroxene, d.3.53, hardness 6-6.5, mol. vol. 65.5; occurs as a brownish, greenish, or black silica mineral, q.v., in Norway, and in boiler scales.

acocantherin A crystalline glucoside from *Acocanthera abyssinica*. The active principle of the shashi arrow poison of eastern Africa, related to ouabain.

acolytine Lyaconine. An alkaloid of *Aconitum*.

aconic acid $\text{C}_5\text{H}_4\text{O}_4 = 128.1$. Formylsuccinic acid lactone, 4,5-dihydro-5-oxo-3-furancarboxylic acid†. Colorless, triclinic crystals, m.164, sparingly soluble in water.

aconine $\text{C}_{25}\text{H}_{41}\text{O}_9\text{N} = 499.6$. An amorphous alkaloid from the root of aconite. **acetylbenzoyl** ~ Aconitine. **pseudo** ~ Pseudoaconitine.

aconitase A. hydratase*. An enzyme which catalyzes the conversion of a citrate into a *cis*-aconitate.

aconite Aconitum, monkshood, wolf's bane, blue rocket, friar's cowl, *Aconitum napellus* (Ranunculaceae). a. alkaloids Alkaloids from *Aconitum* species, e.g.:

Aconine	$\text{C}_{25}\text{H}_{41}\text{O}_9\text{N}$
Indaconine	$\text{C}_{27}\text{H}_{47}\text{O}_9\text{N}$
Pyraconitine	$\text{C}_{32}\text{H}_{41}\text{O}_9\text{N}$
Aconitine	$\text{C}_{34}\text{H}_{47}\text{O}_{11}\text{N}$
Japaconitine	$\text{C}_{34}\text{H}_{49}\text{O}_{11}\text{N}$
Indaconitine	$\text{C}_{34}\text{H}_{47}\text{O}_{10}\text{N}$
Pseudoaconitine	$\text{C}_{36}\text{H}_{51}\text{O}_{12}\text{N}$

a. leaves The dried leaves of *A. napellus*, used similarly to a. root.

aconitic acid 1,2,3-Propenetricarboxylic acid*.

aconitine $\text{C}_{34}\text{H}_{47}\text{O}_{11}\text{N} = 645.7$. Acetylbenzoylaconine. An extremely poisonous alkaloid from the root of *Aconitum napellus*. Colorless prisms, or amorphous powder, m.195, slightly soluble in water; a circulatory sedative. Cf. *aconite alkaloids*. **pseudo** ~ Pseudoaconitine.

a. arsenate Colorless crystals, soluble in water. a. phosphate $\text{C}_{34}\text{H}_{47}\text{O}_{11}\text{N} \cdot \text{H}_3\text{PO}_4 = 743.7$. White crystals, soluble in water. a. salicylate $\text{C}_{34}\text{H}_{47}\text{O}_{11}\text{N} \cdot \text{C}_7\text{H}_6\text{O}_3 = 783.9$. White crystals, soluble in water. a. sulfate $(\text{C}_{34}\text{H}_{47}\text{O}_{11}\text{N})_2 \cdot \text{H}_2\text{SO}_4 = 1389.6$. Colorless (-)-rotatory crystals, soluble in water.

Aconitum A genus of poisonous plants of the Ranunculaceae family. See *aconite*.

acoretin A neutral resin obtained by the oxidation of the aqueous extract of sweet flagroot, *Acorus calamus*.

acorin $\text{C}_{36}\text{H}_{60}\text{O}_6 = 588.9$. A glucoside from calamus; the rhizome of *Acorus calamus*, sweet flag (Araceae); used in perfumery.

acorn The fruit of the oak *Quercus robur*; an astringent. a. flour Racahout. a. sugar Quercitol.

acoustics The study of sound and its effects.

acovenoside A Veneñatin. A cardiac glycoside from the bark and wood of *Acocanthera venenata*, G. Don. Crystalline plates, m.222.

ACP Calcium hydrogenphosphate for use in foods, e.g., baking powders.

acqua Italian for "water."

acquired immunity The resistance of an organism resulting from an attack by an infectious disease. Also artificially produced by treatment with a vaccine or serum.

acraldehyde Acrylaldehyde*.

acre A surface measure: 1 acre = 0.4047 hectare = 4 rods = 160 poles = 1/640 sq mile.

Acree-Rosenheim reaction A reaction used to test for protein. A test solution plus dilute formaldehyde is layered on concentrated sulfuric acid; a purple ring indicates proteins.

acid Pungent, bitter, burning, or irritating; as some burning plastics.

acidic acid $\text{C}_9\text{H}_5\text{N}(\text{COOH})_2 = 217.2$. Acridinic acid, 2,3-quinolinedicarboxylic acid. Colorless crystals, decomp. 130; an oxidation product of acridine.

acridine* $(\text{C}_6\text{H}_4)_2\text{N} \cdot \text{CH} = 179.2$. A tricyclic, heterocyclic hydrocarbon obtained from coal tar. Colorless leaflets, m.109, soluble in water. Used in the synthesis of dyes and drugs. Cf. *chrysianiline*. **diamino** ~ chloride Acriflavine. **diaminodimethyl** ~ A yellow dyestuff. **diamino** ~ sulfate Proflavine.

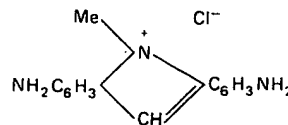
a. dye *para* ~ Derivatives of a. (relative to the methine carbon) as, *acriflavine*, characterized by fluorescent solutions.

acridinic acid Acridic acid.

acridinyl* The radical $\text{C}_{13}\text{H}_8\text{N}-$, from acridine.

acridone* $(\text{C}_6\text{H}_4)_2\text{NH} \cdot \text{CO} = 195.2$. Colorless crystals, m.354, insoluble in water.

acriflavine $\text{C}_{14}\text{H}_{14}\text{N}_3\text{Cl} = 259.7$. 4,8-Diamino-1-methylacridine chloride, trypaflavine,



Brown crystals, soluble in water (fluorescent solution); an antiseptic and disinfectant. a. hydrochloride A more soluble

actinometry The measurement of light intensity.

actinomycetin An antibiotic substance from cultures of *Streptomyces albus*.

actinomycin D Dactinomycin.

actinon Early name for radon-219.

actinouranium Early name for uranium-235. a. series See *radioactive elements*.

actinozoa The phylum Coelenterata, or jellyfish, which have starlike structures.

action The physical concept of activity. **chemical** ~ A reaction in which the atoms of a molecule or molecules are rearranged. **electronic** ~ The change of an electron from one to another energy level. Cf. *excitation*. **physical** ~ A transformation of matter which does not affect molecular structure.

activated Rendered active, reactive, or excited. a. **atom** See *excited atom*. a. **carbon** Charcoal produced by the destructive distillation of vegetable matter, e.g., nutshells, with or without the addition of chemicals. Used in powdered form to decolorize sugar solutions, oils, etc., or in granular form as an adsorbent in gas masks and for the recovery of solvent vapors; used in treatment of poisoning, particularly by drugs, when either it is given by mouth or blood is perfused through it (USP, EP, BP). Cf. *Norit*, *revivification*. a. **molecule** A molecule with one or more excited atoms. Cf. *irradiation*, *excitation*. a. **sludge** The oxidized and flocculent sediment of sewage which contains bacteria. a. s. **process** Sewage is agitated in contact with air, thereby causing oxidation and flocculation by bacterial action; it is left to settle in separation tanks and yields an essentially harmless effluent.

activation (1) A method by which a metallic catalyst is rendered active or is regenerated, e.g., heating platinum sponge. Cf. *revivification*. (2) The transformation of an inactive enzyme into an active enzyme by the creation of a transient substrate-enzyme complex. Cf. *kinase*. (3) *Excitation*. (4) *Irradiation*. (5) A. of carbon, e.g., by heating with steam, or sulfuric acid. **energy of** ~ E_a . The energy required to initiate a reaction or process; sometimes greater than that required to sustain it. Derived from the Arrhenius equation, $E_a = RT^2(\partial \ln k / \partial T)_p$. It is thus related to the dependence of the rate constant on temperature at constant pressure.

activator (1) A catalyst. (2) A substance used in flotation to produce a coating having metallic properties, as, sodium sulfide for lead carbonate ores. (3) In electronics, describing a component, such as a transistor, that produces gain. Cf. *passive*.

activatory See *phase*.

active (1) Dynamic or working, as opposed to static or inert, as in metabolism. (2) Having optical properties, as an asymmetric carbon atom. Cf. *optical activity*. **surface-** ~ See *surfactant*.

a. **center** That part of an enzyme molecule which forms an activated complex with the substrate. a. **deposit** The formation of a radioactive layer on a substance exposed to radioelements. a. **immunity** The stimulation of an organism to produce antibodies against infection by microorganisms. a. **immunization** The processes by which the protective agencies of an organism are made resistant to bacterial invasion. a. **mass** Amount-of-substance concentration. a. **oxygen test** A test for rancidity in fats, by the liberation of iodine from potassium iodide in acetic acid. a. **principle** The substance responsible for the physiological action of a drug; e.g., an alkaloid.

activity (1) The rate in watts at which work is performed. (2)

The ratio of the escaping tendency (*fugacity*) of two phases at the same temperature. A correction applied to the concentration of a strong electrolyte to satisfy *Ostwald's dilution law*, q.v. (3) A measure of interionic forces. (4)* The decay of a radionuclide. See *becquerel*. **amylolytic** ~ Digestive power of amylase. **excited** ~ Active deposit. **ionic** ~ Thermodynamic concentration. In a dilute solution which obeys the gas laws, the i. a. equals the concentration; in other solutions, the value which ensures that the gas laws hold. **optical** ~ The capacity of a substance to rotate the plane of polarized light. **peptic** ~ Digestive power of pepsin. **radio** ~ See *radioactivity*. **tryptic** ~ Digestive power of trypsin.

a. of **activated carbon** The percentage of carbon disulfide vapor absorbed by carbon (generally 50%).

actomyosin A combination of *actin* and *myosin*, q.v., which comprises the tractile muscle system.

actor A compound which takes part in both primary and secondary reactions. See *induced reaction*.

acute Quick, short, or sharp. Cf. *chronic*. a. **poisoning** See *poisoning*.

acyclic* Describing organic compounds which contain no ring system, as, the alkanes. Synonym: Aliphatic (chains). Antonym: cyclic, aromatic (rings).

acyl* An organic radical derived from an organic acid by the removal of the hydroxyl group; e.g., $R \cdot C(O) -$ is the a. radical of $R \cdot CO \cdot OH$. See *acetyl*, *benzenesulfonyl*, *benzoyl*, etc. a. **derivative** An organic compound containing an a. radical, e.g., amides, $R \cdot CO \cdot NH_2$.

acylals* Generic term for compounds of the type $R'CH(OCOR'')$.

acylamines N-substituted primary and secondary amides. More specifically, monoacylamines and diacylamines, respectively.

acylation Acidylation.

acyloins* α -Hydroxy ketones of the type $R \cdot CO \cdot CHOH \cdot R$. Formed by condensation of aldehydes, as, $Ph \cdot CO \cdot CHOH \cdot Ph$, benzoin.

aczol An ammoniacal solution of zinc and copper phenolates; a wood preservative.

adamant A hard mineral, as, diamond.

adamantane $C_{10}H_{16} = 136.2$. Diamantane. **sym-** ~ Tricyclodecane. White crystals, m. 207 (subl.). Its derivatives are used to make plastics heat- and chemical-resistant.

adamantine Diamond. a. **boron** See *boron*. a. **spar** A dark gray, smoky variety of corundum from India; green in transmitted light.

adamellose An igneous andesite-diorite rock containing hornblende, feldspar, quartz, chlorite, agnetite, apatite, and rutile (Pigeon Point, Minn.).

Adam galactometer A graduated buret with two glass bulbs, used in milk analysis.

adamine Adamite.

adamite Zn_2AsO_5 . Adamine. A native arsenate; yellow orthorhombic crystals (Chile, Greece).

Adamkiewicz reaction Protein solutions give a violet ring when layered on glacial acetic acid and concentrated sulfuric acid.

adamsite (1) A greenish-black mica. (2) Diphenylamine chlorarsine. *Adansonia digitata* (Bombacaceae), the baobab tree of Africa, yields edible boui or monkey bread. The bark is an emollient; the dried leaves, lalo, are an antipyretic.

adansonine An alkaloid from the bark and leaves of *Adansonia digitata*. Colorless white crystals; a febrifuge.